

SEQUENCE LISTING

SEQ ID NO: 1: Nucleotide sequence of 11.5 kb PCR product amplified from chromosomal DNA of *C. jejuni* OH4384 which includes *LOS* biosynthesis locus

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1 aaagaatacgc aatttgctaa agagggtttta aatcttagtg gtattgatga aacacatata
61 gaattagcgc caaaatttaa tcttgaagag ctaatggcct ttacaaaaat gatggatcctt
121 atcataggaa atgatagcgg tccaacacat ttagcttttg ctttaataaa agcatctatt
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361 tgatagaata tatcttagtc ttattatat ttgaaaattt ttgttactt ttatgcctga
421 ttgtatcttg catTTTTTAG ctttgattgt agcaagaatc gcttttcac ttaacaaaaa
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601 gcaaaatcaa acaccacca aagaaaaat tctcaataaa gtaaatttca tcaatgaaaa
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SEQ ID NO: 1 (cont'd)

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SEQ ID NO: 1 (cont'd)

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 4141 tctttattta ccaaaaaaaa ctttgtgca aattaataaa tacaacaatg aagattttaat
 4201 taaactttaat aaagctatta taggggaggg gcataaagga tattttaatt atgatgaaaa
 4261 atctaaagat ccaaaatctc ctttgaatcc ttgggctttt atacgagtaa aaaatgaagc
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 4381 atataatgat tgtaccgatg gaagtgaaga aataattcta gaattttgca aacaatatcc
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 7741 aaaaagcagc taagcaagag caagtcacaa ttgattttgc ctttgcaagc gtagtcagca
 7801 ttaaagatat taaaaaggc gaagttttat ctatggataa tatttgggtt aaaagacctg
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SEQ ID NO: 1 (cont'd)

11221 accatattta aactattatc ttactttta tcatcgataa tcaaaatttc aatatctttt
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11341 gggattatga tagaaagttaggcatattt ttcctaaatt ttgttaaaat aataaaaaaca
11401 attctatcaa agtttaggaa atttatgaaa attttttatc acctccaac ctggttaggc
11461 gatacggtaa tggc

SEQ ID NO: 2: Nucleotide sequence that encodes bifunctional sialyltransferase *cstII* from *C. jejuni* strain OH4384 (ORF 7a of *LOS* biosynthesis locus)

ATGAAAAAAG	TTATTATTGC	TGGAAATGGA	CCAAGTTTAA	AAGAAATTGA	50
TTATTCAAGA	CTACCAAATG	ATTTTGATGT	ATTTAGATGT	AATCAATTTT	100
ATTTTGAAGA	TAAATACTAT	CTTGGTAAAA	AATGCAAGGC	AGTATTTTAC	150
AATCCTATTC	TTTTTTTTGA	ACAATACTAC	ACTTTAAAAC	ATTTAATCCA	200
AAATCAAGAA	TATGAGACCG	AACTAATTAT	GTGTTCTAAT	TACAACCAAG	250
CTCATCTAGA	AAATGAAAAT	TTTGTAAGAA	CTTTTACGA	TTATTTTCCT	300
GATGCTCATT	TGGGATATGA	TTTTTTTCAA	CAACTTAAAG	ATTTTAATGC	350
TTATTTTAAA	TTTCACGAAA	TTTATTTCAA	TCAAAGAATT	ACCTCAGGGG	400
TTTATATGTG	TGCAGTAGCC	ATAGCCCTAG	GATACAAAGA	AATTTATCTT	450
TCGGGAATTG	ATTTTATCA	AAATGGGTCA	TCTTATGCTT	TTGATACTAA	500
ACAAAAAAT	CTTTTAAAAT	TGGCTCCTAA	TTTTAAAAAT	GATAATTCAC	550
ACTATATCGG	ACATAGTAAA	AATACAGATA	TAAAAGCTTT	AGAATTTCTA	600
GAAAAAACTT	ACAAAATAAA	ACTATATTGC	TTATGTCCTA	ACAGTCTTTT	650
AGCAAATTTT	ATAGAAGTAG	CGCCAAATTT	AAATTCAAAT	TTTATCATAC	700
AAGAAAAAAA	TAAGTACACT	AAAGATATAC	TCATACCTTC	TAGTGAGGCT	750
TATGGAAAAT	TTTCAAAAAA	TATTAATTTT	AAAAAAATAA	AAATTAAAGA	800
AAATATTTAT	TACAAGTTGA	TAAAAGATCT	ATTAAGATTA	CCTAGTGATA	850
TAAAGCATT	TTTCAAAGGA	AAATAA			876

SEQ ID NO: 3: Amino acid sequence of bifunctional sialyltransferase *CstII* from *C. jejuni* strain OH4384 (encoded by ORF 7a of *LOS* biosynthesis locus)

	10	20	30	40	50
1	MKKVIIAGNG	PSLKEIDYSR	LPNDFDVFR	C NQFYFEDKYY	LGKKCKAVFY
51	NPILFFEQYY	TLKHLIQNQE	YETELIMCSN	YNQAHLENEN	FVKTFYDYFP
101	DAHLGYDFEK	QLKDFNAYFK	FHEIYFNQRI	TSGVYMCABA	IALGYKEIYL
151	SGIDFYQNGS	SYAFDTKQKN	LLKLAPNFKN	DNSHYIGHSK	NTDIKALEFL
201	EKTYKIKLYC	LCPNSLLANF	IELAPNLNSN	FIIQEKNNYT	KDILIPSSEA
251	YGKFSKNINF	KKIKIKENIY	YKLIKDLLRL	PSDIKHYFKG	K

SEQ ID NO: 4: Nucleotide sequence of bifunctional sialyltransferase-encoding *cstII* (ORF7a) from *LOS* biosynthesis locus of *C. jejuni* serotype O:10

ATGAAAAAAG	TTATTATTGC	TGGAAATGGA	CCAAGTTTAA	AAGAAATTGA	50
TTATTCAAGG	CTACCAAATG	ATTTTGATGT	ATTTAGATGC	AATCAATTTT	100
ATTTTGAAGA	TAAATACTAT	CTTGGTAAAA	AATTCAAAGC	AGTATTTTAC	150
AATCCTGGTC	TTTTTTTTGA	ACAATACTAC	ACTTTAAAAC	ATTTAATCCA	200
AAATCAAGAA	TATGAGACCG	AACTAATTAT	GTGTTCTAAT	TACAACCAAG	250
CTCATCTAGA	AAATGAAAAT	TTTGTAAGAA	CTTTTACGA	TTATTTTCCT	300
GATGCTCATT	TGGGATATGA	TTTTTTTAAA	CAACTTAAAG	AATTTAATGC	350
TTATTTTAAA	TTTCACGAAA	TTTATCTCAA	TCAAAGAATT	ACCTCAGGAG	400
TCTATATGTG	TGCAGTAGCT	ATAGCCCTAG	GATACAAAGA	AATTTATCTT	450
TCTGGAATTG	ATTTTATCA	AAATGGGTCA	TCTTATGCTT	TTGATACCAA	500
ACAAGAAAAT	CTTTTAAAAC	TGGCTCCTGA	TTTTAAAAAT	GATCGCTCAC	550
ACTATATCGG	ACATAGTAAA	AATACAGATA	TAAAAGCTTT	AGAATTTCTA	600
GAAAAAACTT	ACAAAATAAA	ACTATATTGC	TTATGTCCTA	ACAGTCTTTT	650
AGCAAATTTT	ATAGAAGTAG	CGCCAAATTT	AAATTCAAAT	TTTATCATAC	700
AAGAAAAAAA	TAAGTACACT	AAAGATATAC	TCATACCTTC	TAGTGAGGCT	750

TATGGAAAAT	TTTCAAAAAA	TATTAATTTT	AAAAAAATAA	AAATTAAAGA	800
AAATATTTAT	TACAAGTTGA	TAAAAGATCT	ATTAAGATTA	CCTAGTGATA	850
TAAAGCATT	TTTCAAAGGA	AAATAA			876

SEQ ID NO: 5. Amino acid sequence of bifunctional sialyltransferase *cstII* encoded by ORF 7a of *LOS* biosynthesis locus from *C. jejuni* serotype O:10

	10	20	30	40	50
1	MKKVIIAGNG	PSLKEIDYSR	LPNDFDVFC	NQFYFEDKYY	LGKKFKAVFY
51	NPGLFFEQYY	TLKHLIQNQE	YETELIMCSN	YNQAHLENEN	FVKTFYDYFP
101	DAHLGYDFFK	QLKEFNAYFK	FHEIYLNQRI	TSGVYMCAVA	IALGYKEIYL
151	SGIDFYQNGS	SYAFDTKQEN	LLKLAPDFKN	DRSHYIGHSK	NTDIKALEFL
201	EKTYKIKLYC	LCPNSLLANF	IELAPNLNSN	FIIQEKNNYT	KDILIPSSEA
251	YGKFSKNINF	KKIKIKENIY	YKLIKDLLRL	PSDIKHYFKG	K

SEQ ID NO: 6. Nucleotide sequence of *C. jejuni* serotype O:41 *cstII* coding region

ATGAAAAAAG	TTATTATTGC	TGGAAATGGA	CCAAGTTTAA	AAGAAATTGA	50
TTATTCAAGA	CTACCAAATG	ATTTTGATGT	ATTTAGATGC	AATCAATTTT	100
ATTTTGAAGA	TAAATACTAT	CTTGGTAAAA	AATGCAAAGC	AGTATTTTAC	150
AATCCTAGTC	TTTTTTTTGA	ACAATACTAC	ACTTTAAAC	ATTTAATCCA	200
AAATCAAGAA	TATGAGACCG	AACTAATCAT	GTGTTCTAAT	TTTAACCAAG	250
CTCATCTAGA	AAATCAAAAT	TTTGTAAGAA	CTTTTACGA	TTATTTTCCT	300
GATGCTCATT	TGGGATATGA	TTTTTTTCAA	CAACTTAAAG	AATTCATGC	350
TTATTTTAAA	TTTCACGAAA	TTTATTTCAA	TCAAAGAATT	ACCTCAGGGG	400
TCTATATGTG	CACAGTAGCC	ATAGCCCTAG	GATACAAAGA	AATTTATCTT	450
TCGGGAATTG	ATTTTATCA	AAATGGATCA	TCTTATGCTT	TTGATACCAA	500
ACAAAAAAAT	CTTTTAAAT	TGGCTCCTAA	TTTTAAAAAT	GATAATTCAC	550
ACTATATCGG	ACATAGTAAA	AATACAGATA	TAAAAGCTTT	AGAATTTCTA	600
GAAAAAACTT	ACGAAATAAA	GCTATATTGT	TTATGTCCTA	ACAGTCTTTT	650
AGCAAATTTT	ATAGAACTAG	CGCCAAATTT	AAATTCAAAT	TTTATCATAC	700
AAGAAAAAAA	TAACTATACT	AAAGATATAC	TCATACCTTC	TAGTGAGGCT	750
TATGGAAAAT	TTACAAAAAA	TATTAATTTT	AAAAAAATAA	AAATTAAAGA	800
AAATATTTAT	TACAAGTTGA	TAAAAGATCT	ATTAAGATTA	CCTAGTGATA	850
TAAAGCATT	TTTCAAAGGA	AAATAA			876

SEQ ID NO: 7. Amino acid sequence of *CstII* from *C. jejuni* serotype O:41

	10	20	30	40	50
1	MKKVIIAGNG	PSLKEIDYSR	LPNDFDVFC	NQFYFEDKYY	LGKKCKAVFY
51	NPSLFFEQYY	TLKHLIQNQE	YETELIMCSN	FNQAHLENQN	FVKTFYDYFP
101	DAHLGYDFFK	QLKEFNAYFK	FHEIYFNQRI	TSGVYMCTVA	IALGYKEIYL
151	SGIDFYQNGS	SYAFDTKQKN	LLKLAPNFKN	DNSHYIGHSK	NTDIKALEFL
201	EKTYEIKLYC	LCPNSLLANF	IELAPNLNSN	FIIQEKNNYT	KDILIPSSEA
251	YGKFTKNINF	KKIKIKENIY	YKLIKDLLRL	PSDIKHYFKG	K

SEQ ID NO: 8. Nucleotide sequence of coding region for *CstII* from *C. jejuni* O:19.

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1 atgaaaaaag ttattattgc tggaaatgga ccaagttaa aagaaattga
51 ttattcaagg ctaccaaatg attttgatgt atttagatgt aatcaatttt
101 attttgaaga taaatactat cttggtaaaa aatgcaaagc agtgttttac
151 acccctaatt tcttctttga gcaatactac actttaaaac atttaacca
201 aaatcaagaa tatgagaccg aactaattat gtgttcta atacaaccaag
251 ctcactctaga aaatgaaaat tttgtaaaaa ctttttacga ttattttcct
301 gatgctcatt tgggatatga ttttttttaa caacttaaag aatttaattgc
351 ttatttttaa tttcacgaaa tttattttcaa tcaaagaatt acctcagggg
401 tctatatgtg tgcagtagcc atagccctag gatacaaaga aatttatctt
451 tcgggaattg atttttatca aaatgggtca tcttatgctt ttgatacca
501 acaagaaaat ctttttaaaac tagcccctga ttttaaaaat gatcgctcgc
551 actatatcgg acatagtaaa aatacagata taaaagcttt agaatttcta
601 gaaaaaactt acaaaaataaa actatatgtc ttatgtccta atagtctttt
651 agcaaatttt atagaactag cgccaaattt aaattcaaat tttatcatac
701 aagaaaaaaa taactacact aaagatatat tcataccttc tagtgaggct
751 tatggaaaat tttcaaaaaa tattaatttt aaaaaataa aaattaaaga
801 aaatgtttat tacaagttga taaaagatct attaagatta cctagtgata
851 taaagcatta tttcaaagga aaataa

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SEQ ID NO: 9. Amino acid sequence of *CstII* from *C. jejuni* O:19.

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1 MKKVIIAGNG PSLKEIDYSR LPNDFDVFR C NQFYFEDKYY LGKKCKAVFY
51 TPNFFFEQYY TLKHLIQNQE YETELIMCSN YNQAHLNEN FVKTFYDYFP
101 DAHLGYDFFK QLKEFNAYFK FHEIYFNQRI TSGVYMCABA IALGYKEIYL
151 SGIDFYQNGS SYAFDTKQEN LLKLAPDFKN DRSHYIGHSK NTDIKALEFL
201 EKTYKIKLYC LCPNSLLANF IELAPNLNSN FIIQEKNNYT KDILIPSSEA
251 YGKFSKNINF KIKIKENVY YKLIKDLLRL PSDIKHYFKG K

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SEQ ID NO: 10. Amino acid sequence of *CstII* from *C. jejuni* strain NCTC 11168

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          10          20          30          40          50
1 MSMNINALVC GNGPSLKNID YKRLPKQFDV FRCNQFYFED RYFVGKDVKY
51 VFFNPFVFFE QYYTSKKLIQ NEEYNIENIV CSTINLEYID GFQFVDNFEL
101 YFSDAFLGHE IIKKLKDDFA YIKYNEIYNR QRITSGVYMC ATAVALGYKS
151 IYISGIDFYQ DTNNLYAFDN NKNLLNKCT GFKNQKFKFI NHSMACDLQA
201 LDYLMKRYDV NIYSLNSDEY FKLAPDIGSD FVLSKKPKKY INDILIPDKY
251 AQERYYGKKS RLKENLHYKL IKDLIRLPSD IKHYLKEKYA NKNR

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SEQ. ID NO: 11. Nucleotide sequence for coding region for *Cst II* from *C. jejuni* O:4

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1 ATGAAAAAAG TTATTATTGC TGGAAATGGA CCAAGTTTAA AAGAAATTGA TTATTCAAGG
61 CTACCAAATG ATTTTGATGT ATTTAGATGT AATCAATTTT ATTTTGAAGA TAAATACTAT
121 CTTGGTAAAA AATGCAAAGC AGTGTTTTAC ACCCCTGGTT TCTTCTTTGA GCAATACTAC
181 ACTTTAAAAC ATTTAATCCA AAATCAAGAA TATGAGACCG AACTAATTAT GTGTTCTAAT
241 TACAACCAAG CTCATCTAGA AAATGAAAAT TTTGTAAAAA CTTTTTACGA TTATTTTCCT
301 GATGCTCATT TGGGATATGA TTTTTTAAAA CAACTTAAAG AATTTAATGC TTATTTTAAA
361 TTTACAGAAA TTTATTTCAT TCAAAGAATT ACCTCAGGGG TCTATATGTG TGCAGTAGCC
421 ATAGCCCTAG GATACAAAGA AATTATCTT TCGGGAATTG ATTTTATCA AAATGGGTCA
481 TCTTATGCTT TTGATACCAA ACAAGAAAAT CTTTTAAAAC TAGCCCCTGA TTTTAAAAAT
541 GATCGCTCAC ACTATATCGG ACATAGTAAA AATACAGATA TAAAAGCTTT AGAATTCTA

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601 GAAAAAACTT ACAAATAAA ACTATATTGC TTATGTCCTA ACAGTCTTTT AGCAAATTTT
661 ATAGAACTAG CGCCAAATTT AAATTCAAAT TTTATCATAC AAGAAAAAAA TAACTACACT
721 AAAGATATAC TCATACCTTC TAGTGAGGCT TATGGAAAAT TTTCAAAAAA TATTAATTTT
781 AAAAAAATAA AAATTAAAGA AAATGTTTAT TACAAGTTGA TAAAAGATCT ATTAAGATTA
841 CCTAGTGATA TAAAGCATTA TTTCAAAGGA AAA

SEQ ID NO: 12. Amino acid sequence of Cst II from *C. jejuni* 0:4

MKKVIIAGNG PSLKEIDYSR LPNDFDVFR C NQFYFEDKYY LGKKCKAVFY TPGFFFEQY
YTLKHLIQNQ EYETELIMCS NYNQAHLNE NFVKTFYDYF PDAHLGYDFF KQLKEFNAY
FKFHEIYFNQ RITSGVYMCA VAIALGYKEI YLSGIDFYQN GSSYAFDTKQ ENLLKLAPD
FKNDRSHYIG HSKNTDIKAL EFLEKTYKIK LYCLCPNSLL ANFIELAPNL NSNFIIQEK
NNYTKDILIP SSEAYGKFSK NINFKKIKIK ENVYKLIKD LLRLPSDIKH YFKGK

SEQ ID NO: 13. Nucleotide sequence for coding region for Cst II from *C. jejuni* 0:36

ATGAAAAAAG TTATTATTGC TGGAAATGGA CCAAGTTTAA AAGAAATTGA TTATTCAAGG
CTACCAAATG ATTTTGATGT ATTTAGATGT AATCAATTTT ATTTTGAAGA TAAATACTAT
CTTGGTAAAA AATGCAAAAC AGTGTTTTAC ACCCCTAATT TCTTCTTTGA GCAATACTAC
ACTTTAAAC ATTTAATCCA AAATCAAGAA TATGAGACCG AACTAATTAT GTGTTCTAAT
TACAACCAAG CTCATCTAGA AAATGAAAAA TTTGTAAAAA CTTTTTACGA TTATTTTCCT
GATGCTCATT TGGGATATGA TTTTTTAAAA CAACTTAAAG AATTTAATGC TTATTTTAAA
TTTCACGAAA TTTATTTCAA TCAAAGAATT ACCTCAGGGG TCTATATGTG TGCAGTAGCC
ATAGCCCTAG GATACAAAGA AATTTATCTT TCGGGAATTG ATTTTATCA AAATGGGTCA
TCTTATGCTT TTGATACCAA ACAAGAAAAA CTTTTAAAC TAGCCCCTGA TTTTAAAAAT
GATCGCTCAC ACTATATCGG ACATAGTAAA AATACAGATA TAAAAGCTTT AGAATTTCTA
GAAAAAACTT ACAAATAAA ACTATATTGC TTATGTCCTA ATAGTCTTTT AGCAAATTTT
ATAGAACTAG CGCCAAATTT AAATTCAAAT TTTATCATAC AAGAAAAAAA TAACTACACT
AAAGATATAC TCATACCTTC TAGTGAGGCT TATGGAAAAT TTTCAAAAAA TATTAATTTT
AAAAAATAA AAATTAAAGA AAATGTTTAT TACAAGTTGA TAAAAGATCT ATTAAGATTA
CCTAGTGATA TAAAGCATTA TTTCAAAGGA AAA

SEQ ID NO: 14. Amino acid sequence of Cst II from *C. jejuni* 0:36.

MKKVIIAGNG PSLKEIDYSR LPNDFDVFR C NQFYFEDKYY LGKKCKTVFY TPNFFFEQY
YTLKHLIQNQ EYETELIMCS NYNQAHLNE NFVKTFYDYF PDAHLGYDFF KQLKEFNAY
FKFHEIYFNQ RITSGVYMCA VAIALGYKEI YLSGIDFYQN GSSYAFDTKQ ENLLKLAPD
FKNDRSHYIG HSKNTDIKAL EFLEKTYKIK LYCLCPNSLL ANFIELAPNL NSNFIIQEK
NNYTKDILIP SSEAYGKFSK NINFKKIKIK ENVYKLIKD LLRLPSDIKH YFKGK

SEQ ID NO: 15: Nucleotide sequence of glycosyltransferase-encoding ORF 4a of *LOS* biosynthesis locus from *C. jejuni* strain OH4384

ATGAAGAAAA	TAGGTGTAGT	TATACCAATC	TATAATGTAG	AAAAATATTT	50
AAGAGAATGT	TTAGATAGCG	TTATCAATCA	AACCTTATACT	AACTTAGAAA	100
TCATACTTGT	CAATGATGGT	AGCACAGATG	AACACTCACT	CAATATTGCA	150
AAAGAATATA	CCTTAAAGA	TAAAAGAATA	ACTCTTTTTG	ATAAGAAAAA	200
TGGGGGTTTA	AGTTCAGCTA	GAAATATAGG	TATAGAATAC	TTTAGCGGGG	250
AATATAAATT	AAAAACAAA	ACTCAACATA	TAAAAGAAAA	TTCTTTAATA	300
GAATTTCAAT	TGGATGGTAA	TAATCCTTAT	AATATATATA	AAGCATATAA	350
AAGCTCTCAA	GCTTTTAATA	ATGAAAAAGA	TTTAACCAAT	TTTACTTACC	400
CTAGTATAGA	TTATATTATA	TTCTTAGATA	GTGATAATTA	TTGGAACATA	450
AACTGCATAG	AAGAATGCGT	TATAAGAATG	AAAAATGTGG	ATGTATTGTG	500
GTTTGACCAT	GATTGCACCT	ATGAAGACAA	TATAAAAAAT	AAGCACAAAA	550
AAACAAGGAT	GGAAATTTTT	GATTTTAAAA	AAGAATGTAT	AATCACTCCA	600

AAAGAATATG	CAAATCGAGC	ATTAAGTGTA	GGATCTAGAG	ATATTTCTTT	650
TGGATGGAAT	GGAATGATTG	ATTTTAATTT	TTTAAAGCAA	ATTAACTTA	700
AATTTATAAA	TTTTATTATC	AATGAAGATA	TACACTTTGG	GATAATTTTG	750
TTTGCTAGTG	CTAATAAAAT	TTATGTTTTA	TCACAAAAGT	TGTATTTGTG	800
TCGTTTAAGA	GCAAAACAGTA	TATCAAATCA	TGATAAGAAG	ATTACAAAAG	850
CAAATGTGTC	AGAGTATTTT	AAAGATATAT	ATGAAACTTT	CGGGGAAAAC	900
GCTAAGGAAG	CAAAAAATTA	TTTAAAAGCA	GCAAGCAGGG	TTATAACTGC	950
TTTAAAATTG	ATAGAATTTT	TTAAAGATCA	AAAAAACGAA	AATGCACTTG	1000
CTATAAAAGA	AACATTTTTA	CCTTGCTATG	CCAAAAAAGC	TTTAATGATT	1050
AAAAAATTTA	AAAAAGATCC	TTTAAATTTA	AAGGAACAAT	TAGTTTTAAT	1100
TAAACCTTTT	ATTCAAACAA	AACTTCCTTA	TGATATTTGG	AAATTTTGGC	1150
AAAAAATAAA	AAATATTTAA				1170

SEQ ID NO: 16: Nucleotide sequence of β 1,4 GalNAc transferase-encoding ORF 5a of *LOS* biosynthesis locus from *C. jejuni* strain OH4384

ATGCTATTTT	AATCATACTT	TGTGAAAATA	ATTTGCTTAT	TCATCCCTTT	50
TAGAAAAAAT	AGACATAAAA	TAAAAAAAC	ATTTTTACTA	AAAAACATAC	100
AACGAGATAA	AATCGATTCT	TATTTACCAA	AAAAAACTCT	TGTGCAAATT	150
AATAAATACA	ACAATGAAGA	TTTAATTAAA	CTTAATAAAG	CTATTATAGG	200
GGAGGGGCAT	AAAGGATATT	TTAATTATGA	TGAAAAATCT	AAAGATCCAA	250
AATCTCCTTT	GAATCCTTGG	GCTTTTATAC	GAGTAAAAAA	TGAAGCTATT	300
ACCTTAAAAG	CTTCTCTTGA	AAGCATATTG	CCTGCTATCC	AAAGAGGTGT	350
TATAGGATAT	AATGATTGTA	CCGATGGAAG	TGAAGAAATA	ATTCTAGAAT	400
TTTGCAAACA	ATATCCTTCA	TTTATACCAA	TAAAATATCC	TTATGAAATT	450
CAAATTCAAA	ACCCAAAATC	AGAAGAAAAT	AAACTCTATA	GCTATTATAA	500
TTATGTTGCA	AGTTTTATAC	CAAAAGATGA	GTGGCTTATA	AAAATAGATG	550
TGGATCATAT	CTATGATGCT	AAAAAACTTT	ATAAAAGCTT	CTATATACCA	600
AAAAACAAAT	ATGATGTAGT	TAGTTATTCA	AGGGTTGATA	TTCATTATTT	650
TAATGATAAT	TTTTTCTTTT	GTAAAGATAA	TAATGGCAAT	ATATTGAAAG	700
AACCAAGAGA	TTGCTTGCTT	ATCAATAATT	ATAACTTAAA	ATGGAAAGAA	750
GTATTAATTG	ACAGAATCAA	TACAAATTGG	AAAAAAGCAA	CAAAACAAAG	800
TTTTTCTTCA	AATATACACT	CTTTAGAGCA	ATTAAAGTAT	AAACACAGGA	850
TATTATTTCA	CACTGAATTA	AATAATTATC	ATTTTCCTTT	TTTAAAAAAA	900
CATAGAGCTC	AAGATATTTA	TAAATATAAT	TGGATAAGTA	TTGAAGAATT	950
TAAAAAATTC	TATTTACAAA	ATATTAATCA	TAAAATAGAA	CCTTCTATGA	1000
TTTCAAAAGA	AACTCTAAAA	AAAATATTCT	TAACATTGTT	TTAA	1044

SEQ ID NO: 17: Amino acid sequence of β 1,4 GalNAc transferase from *C. jejuni* strain OH4384 (encoded by ORF 5a of *LOS* biosynthesis locus)

	10	20	30	40	50
1	MLFQSYFVKI	ICLFIPFRKI	RHKIKKTFL	KNIQRDKIDS	YLPKKTLLVQI
51	NKYNNEGLIK	LNKAIIGEGH	KGYFNYDEKS	KDPKSPLNPW	AFIRVKNEAI
101	TLKASLESIL	PAIQRGVIGY	NDCTDGSEEI	ILEFCKQYPS	FIPIKYPYEI
151	QIQNPKESEN	KLYSYNYVA	SFIPKDEWLI	KIDVDHIYDA	KKLYKSFYIP
201	KNKYDVVSYS	RVDIHYFNDN	FFLCKDNNGN	ILKEPGDLLL	INNYNLKWKE
251	VLIDRINNNW	KKATKQSFSS	NIHSLEQLKY	KHRILFHTEL	NNYHFPFLKK
301	HRAQDIYKYN	WISIEEFKKF	YLQNINHKIE	PSMISKETLK	KIFLTLF

SEQ. ID NO: 18. Nucleotide sequence of β -1,4-GalNAc transferase from *C. jejuni* 0:1.

ATGACTTTGT	TTTATAAAAT	TATAGCTTTT	TTAAGATTGC	TTAAAAATTGA	TAAAAAATTA
AAATTTGATA	ATGAATATTT	TTTAAACTTA	AATAAAAAAAA	TCTACAAATGA	AAAGCATAAA
GGTTTTTTTG	ATTTTGATCC	AAACTCAAAA	GATACAAAAT	CTCCTTTAAA	TCCATGGGCT
TTTATAAGAG	TAAAAAATGA	AGCCACTACT	TTAAGAGTAT	CACTTGAAAG	TATGTTACCT
GCCATACAAA	GAGGTGTTAT	AGGATATAAT	GATTGTACTG	ATGGAAGTGA	AGAAATTATT
TTGGAATTTT	GCAAACAATA	CCCTTCGTTT	ATACCAGTAA	AATATCCCCA	TGAGGTGCAA
ATTGAAAATC	CGCAAAGCGA	AGAAAATAAA	CTTCATAGTT	ATTATAACTA	TGTAGCTAGT
TTTATACCGC	AAGATGAGTG	GCTTATAAAA	ATAGATGTGG	ATCATTACTA	TGATGCAAAA
AAATTATATA	AGAGTTTTTA	TATGGCATCA	AAAAATACTG	CTGTTAGATT	TCCAAGAATT
AAATTTTTTA	TACTAGATAA	AATTGTAATT	CAAAATATAG	GAGAATGTGG	TTTTATCGAT
GGAGGGGATC	AATTGTTAAT	TCAAAAGTGC	AATAGTGAT	TTATAGAAAAG	AATGGTTTCA
AAGCAAAGTC	AGTGGATTGA	TCCTGAAAAA	ACTGTGAAAG	AATTGTATTTC	TGAACAGCAA
ATTATACCCA	AACATATAAA	AATCTTACAA	GCAGAATTAC	TTCAATGGCA	TTTTCTTGCT
TTAAAAATATC	ATAGAAATGA	TTATCAAAAA	CATTGGATG	CTTTAACTTT	AGAAGATTTT
AAAAAAATCC	ATTATAGACA	TAGAAAAATA	AAGAAAATAA	ATTATACAAT	GCTTGATGAA
AAAGTAATTC	GTGAAATATT	AGATAAATTT	AAATTGAGTG	GTAATAAAAT	GACTTTAGCT
ATAATACCTG	CTCGAGCTGG	TTCAAAAGGT	ATAAAAAATA	AAAATTTAGC	TCTTTTGCAT
GATAGGCCTT	TGTTGTATTA	TACTATCAAT	GCAGCAAAAA	ATTCAAAGTA	TGTAGTAAAA
ATTGTTTTTA	GTAGTGATGG	CGATGATATA	TTAGAATATG	GACAACTCA	AGGTGTAGAT
GTGTTAAAAA	GACCTAAAGA	ATTAGCGCTA	GATGATACAA	CTAGTGATAA	GGTTGTATTG
CATACCTTGA	GTTTTTATAA	AGATTATGAA	AATATTGTTT	TATTACAACC	CACTTCTCCT
TTAAGGACAA	ATGTACATAT	AGATGAAGCT	TTTTTAAAT	TTAAAAATGA	AAACTCAAAT
GCATTAATAA	GTGTTGTAGA	ATGTGATAAT	AAAAATTTAA	AAGCTTTTAT	AGATGATAAT
GGTAACTTAA	AAGGAATTTG	TGATAACAAA	TATCCATTTA	TGCCTAGACA	AAAATTACCA
AAAACCTTATA	TGAGTAATGG	TGCAATTTAT	ATAGTAAAGT	CAAATTTATT	TTTAAATAAC
CCAACCTTTTC	TACAAGAAAA	AACAAGTTGC	TATATAATGG	ACGAAAAAGC	TAGTTTGGAT
ATAGATACAA	CAGAGGATTT	AAAAAGAGTT	AATAATATAA	GCTTCTTA	

SEQ. ID NO: 19. Amino Acid sequence of β -1,4-GalNAc transferase from *C. jejuni* 0:1.

MTLFYKIIAF	LRLKIDKKL	KFDNEYFLNL	NKKIYNEKHK	GFFDFDPNSK	DTKSPLNPW
AFIRVKNEAT	TLRVSLESML	PAIQRGVIGY	NDCTDGSEEI	ILEFCKQYPS	FIPVKYPHE
VQIENPQSEE	NKLHSYNYV	ASFIPQDEWL	IKIDVDHYD	AKKLYKSFYM	ASKNTAVRF
PRINFLILDK	IVIQNIGECG	FIDGGDQLLI	QKNSVFIER	MVSKQSQWID	PEKTVKELY
SEQQIIPKHI	KILQAEELLQW	HFPALKYHRN	DYQKHLDALE	LEDFKKIHYR	HRKIKKINY
TMLDEKVIRE	ILDKFKLSGK	KMTLAIIPAR	AGSKGIKNKN	LALLHDRPLL	YYTINAAKN
SKYVDKIVLS	SDGDDILEYG	QTQGVVVLKR	PKELALDDTT	SDKVVLHTLS	FYKDYENIV
LLQPTSPLRT	NVHIDEAFLK	FKNENSNALI	SVVECDNKIL	KAFIDDNGNL	KGICDNKYP
FMPRQKLPKT	YMSNGAIYIV	KSNLFLNNPT	FLQEKTSYI	MDEKASLDID	TTEDLKRNNI SFL

SEQ. ID NO: 20. Nucleotide sequence of β -1,4-GalNAc transferase from *C. jejuni* 0:10.

ATGCTATTTT	AATCATACTT	TGTGAAAATA	ATTTGCTTAT	TCATCCCTTT	TAGAAAAATT
AGACATAAAA	TAAAAAAAAC	ATTTTACTA	AAAAACATAC	AACGAGATAA	AATCGATTCT
TATCTACCAA	AAAAAACTCT	TATACAAATT	AATAAATACA	ACAATGAAGA	TTTAATTAAA
CTTAATAAAG	CTATTATAGG	GGGGGGGCAT	AAAGGATATT	TTAATTATGA	TGAAAAATCT
AAAGATCCAA	AATCTCCTTT	GAATCCTTGG	GCTTTTATAC	GAGTAAAAAA	TGAAGCTATT
ACCTTAAAAG	CTTCTCTTGA	AAGCATATTG	CCTGCTATT	AAAGAGGTGT	TATAGGATAT
AATGATTGCA	CCGATGGAAG	TGAAGAAAATA	ATTCTAGAAT	TTTGCAAACA	ATATCCTTCA
TTTATACCAA	TAAAATATCC	TTATGAAATT	CAAAATCAAA	ACCCAAAATC	AGAAGAAAAT
AAACTCTATA	GCTATTATAA	TTATGTTGCA	AGTTTATAC	CAAAAGATGA	GTGGCTCATA
AAAATAGATG	TGGATCATTA	TTATGATGCA	AAAAAATTAT	ATAAGAGTTT	TTATATACCT
AGAAAAAATT	ATCATGTAAT	TAGTTACTCT	AGGATAGATT	TTATATTTAA	TGAAGAAAAA
TTTTATGTTT	ATCGGAATAA	GGAGGGGGAG	ATTTTAAAAG	CTCCTGGAGA	TTGTTTAGCA
ATACAAAACA	CTAACTTATT	TTGGAAAAGAA	ATACTTATTG	AAGATGATAC	ATTTAAGTGG
AATACTGCAA	AAAATAATAT	AGAGAATGCA	AAATCATATG	AAATTTTAAA	AGTTAGAAAT
AGAATTTATT	TTACTACAGA	ACTTAATAAT	TATCATTTTC	CATTTATAAA	AAATTATAGA
AAAAATGATT	ATAAGCAGTT	AAATTGGGTT	AGCTTAGATG	ATTTTATTAA	AAATTATAAA
GAAAAATTAA	AAAATCAAAT	AGATTTTAAA	ATGCTAGAAAT	ACAAAACATT	AAAAAAGTG
TACAAAAAGC	TTACATCTTC	AGCAAGCGAT	AAAATT		

SEQ. ID NO: 21. Amino acid sequence of β -1,4-GalNAc transferase from *C. jejuni* 0:1.

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MLFQSYFVKI ICLFIPFRKI RHKIKKTFLI KNIQRDKIDS YLPKKTLLIQI NKYNNEDLI
KLNKAIIGGG HKGYFNYDEK SKDPKSPLNP WAFIRVKNEA ITLKASLESI LPAIQRGVI
GYNDCTDGSE EIILEFCKQY PSFIPIKYPY EIQIQNPKE ENKLYSYNY VASFIPKDE
WLIKIDVDHY YDAKKLYKSF YIPRKNYHVI SYSRIDFIFN EEKFYVYRNK EGEILKAPG
DCLAIQNTNL FWKEILIEDD TFKWNTAKNN IENAKSYEIL KVRNRIYFTT ELNNYHFPF
IKNYRKNDYK QLNWVSLDDF IKNYKEKLKN QIDFKMLEYK TLKKVYKCLT SSASDKI
```

**SEQ. ID NO: 22. Nucleotide sequence of β -1,4-GalNAc transferase from *C. jejuni* 0:1.
O:36**

DNA :

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ATGCTTAAAA AAATCATTTT TTTATATAAA AGATACTCGA TTTCTAAAAA ATTGGTTTAA
GATAATGAGC ATTTTCATTAA GGAAAAATAAA AACATCTATG GAAAAAACA TAAGGGCTTT
TTTGACTTTG ATGAAAAGGC TAAGGATGTG AAATCACCCC TTAATCCTTG GGGATTTATC
AGGGTTAAAA ATGAAGCTTT AACCTAAGA GTTTCCTTTAG AAAGTATACT ACCTGCTTTA
CAAAGAGGAA TTATAGCTTA CAACGACTGT GATGATGGGA GTGAAGAGCT TATTTTAGAA
TTTTGCAAGC AATATCCCAA CTTCAATTGCT AAAAAATATC CTTATAAAGT AGATCTAGAA
AATCCTAAAA ATGAAGAAAA TAAACTTTAC TCTTATTACA ATTGGGCAGC ATCTTTTATA
CCCTTAGATG AGTGGTTTAT AAAAATCGAT GTGGATCATT ACTACGATGC CAAGAAGCTT
TATAAGAGTT TTTATAGGAT TGATCAAGAA AATAAAGCCT TATGCTACCC AAGAATTAAT
TTTATAATCT TAAATGGAAA TATTTATGTG CAAAATAGTG GAAATTATGG ATTCATAGGG
GGGGGGGATC AACTCTTGAT TAAAAGAAGA AATAGTAGCT TTATAGAAAG AAGGGTTTCA A
AAAAAGCCA ATGGATAGAT CCTAAGGGAC TTATAGAAGA ACTCTACTCC GAGCAACAAG
TCTTATCTCA AGGAGTGAAA ATACTACAAG CTCCCCTACT TCAGTGGCAT TTTCTGCCT
TAAATATCCG CCGAAACGAT TACCAACAAT ATTTAGATAT CTTGAGTTTA GAAGAATTTT
AGGCCTTTCA TCGTAAGAGC AAAGAGGCTA AAAAAATAGA CTTTGCCATG CTAAAACGCC
CTGTAATCGA GCAAATATTA AAGAAATTC AAGGAGAGAT AAAA
```

SEQ. ID NO: 23. Amino acid sequence of β -1,4-GalNAc transferase from *C. jejuni* 0:36.

```
MLKKIISLYK RYSISKKLVL DNEHFIKENK NIYGKKHKGF FDFDEKAKDV
KSPLNPWGFI RVKNEALTLR VSLESILPAL QRGIIAYNDC DDGSEELILE
FCKQYPNFIA KKYPYKVDLE NPKNEENKLY SYYNWAASFI PLDEWFIKID
VDHYYDAKKL YKSFYRIDQE NKALCYPRIN FIILNGNIYV QNSGNYGFIG
GGDQLLIKRR NSSFIERRVS KKSQWIDPKG LIEELYSEQQ VLSQGVKILQ
APLLQWHFPA LKYRRNDYQQ YLDILSLEEF QAFHRKSKEA KKIDFAMLR
PVIEQILKKF QGEIK
```

SEQ. ID NO: 24. Nucleotide sequence of β -1,4-GalNAc transferase from *C. jejuni* NCTC11168

```
ATGACTTTGT TTTATAAAAT TATAGCTTTT TTAAGATTGC TTAAAATTGA TAAAAAATTA
AAATTTGATA ATGAATATTT TTAAACTTAA AATAAAAAAA TCTACGATGA AAAGCATAAA
GGTTTTTTTG ATTTTGATCC AAACCTCAAAA GATACAAAAT CTCCTTTAAA TCCATGGGCT
TTTATAAGAG TAAAAAATGA AGCCACTACT TTAAGAGTAT CACTTGAAAG TATGTTACCT
GCCATACAAA GAGGTGTTAT AGGATATAAT TATTGTACTG ATGGAAGTGA AGAAATTATT
TTGGAATTTT GCAAACAATA CCCTTCGTTT ATACCAGTAA AATATCCCCA TGAGGTGCAA
ATTGAAAATC CGCAAAGCGA AGAAAATAAA CTTCATAGTT ATTATAACTA TGATGCTAGT
TTTATACCGC AAGATGAGTG GCTTATAAAA ATAGATGTGG ATCATTACTA TGATGCAAAA
AAATTATATA AGAGTTTTTA TATGGCATCA AAAAATACTG CTGTTAGATT TCCAAGAATT
AATTTTTTAA TACTAGATAA AATTGTAATT CAAAATATAG GAGAATGTGG TTTTATCGAT
GGAGGGGATC AATTGTTAAT TCAAAGTGC AATAGTGTAT TTATAGAAAG AATGGTTTCA
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AAGCAAAGTC AGTGGATTGA TCCTGAAAAA ACTGTGAAAG AATTGTATTC TGAACAGCAA
ATTATACCCA AACATATAAA AATCTTACAA GCAGAATTAC TTCAATGGCA TTTTCCTGCT
TTAAAATATC ATAGAAATGA TTATCAAAAA CATTGGGATG CTTTAACTTT AGAAGATTTT
AAAAAATCC ATTATAGACA TAGAAAAATA AAGAAAATAA ATTATACAAT GCTTGATGAA
AAAGTAATTC GTGAAATATT AGATAAATTT AAATTGAGTG GTAAAAAAT GACTTTAGCT
ATAATACCTG CTCGAGCTGG TTCAAAAGGT ATAAAAAATA AAAATTTAGC TCTTTTGCAT
GATAGGCCTT TGTGTATTA TACTATCAAT GCAGCAAAAA ATTCAAAGTA TGATAGATAAA
ATTGTTTTAA GTAGTGATGG CGATGATATA TTAGAATATG GACAAACTCA AGGTGTAGAT
GTGTTAAAAA GACCTAAAGA ATTAGCGCTA GATGATACAA CTAGTGATAA GGTTGTATTG
CATACCTTGA GTTTTTATAA AGATTATGAA AATATTGTTT TATTACAACC CACTTCTCCT
TTAAGGACAA ATGTACATAT AGATGAAGCT TTTTAAAAAT TAAAAATGA AAACCTCAAT
GCATTAATAA GTGTTGTAGA ATGTGATAAT AAAATTTTAA AAGCTTTTAT AGATGATAAT
GGTAACTTAA AAGGAATTTG TGATAACAAA TATCCATTTA TGCCTAGACA AAAATTACCA
AAAACCTATA TGAGTAATGG TGCAATTTAT ATAGTAAAGT CAAATTTATT TTTAAATAAC
CCAACCTTTC TACAAGAAAA AACAAGTTGC TATATAATGG ACGAAAAAGC TAGTTTGGAT
ATAGATACAA CAGAGGATTT AAAAGAGTT AATAATATAA GCTTCTTA

SEQ. ID NO: 25. Amino Acid sequence of β -1,4-GalNAc transferase from *C. jejuni* NCTC11168

MTLFYKIIAF LRLKIDKKL KFDNEYFLNL NKKIYDEKHK GFFDFDPNSK DTKSPLNPW
AFIRVKNEAT TLRVSLESML PAIQRGVIGY NDCTDGSEEI ILEFCKQYPS FIPVKYPHE
VQIENPQSEE NKLHSYNYV ASFIPQDEWL IKIDVDHYD AKKLYKSFYM ASKNTAVRF
PRINFLILDK IVIQNIGECG FIDGGDQLLI QKCNVFIER MVSKQSOWID PEKTVKELY
SEQQIIPKHI KILQAELOW HFPALKYHRN DYQKHLALT LEDFKKIHRY HRKIKKINY
TMLDEKVIRE ILDKFKLSGK KMTLAIIPAR AGSKGIKNKN LALLHDRPLL YYTINAANK
SKYVDKIVLS SDGDDILEYG QTQGVVDLKR PKELALDDTT SDKVVLHTLS FYKDYENIV
LLQPTSPRLT NVHIDEAFLK FKNENSNALI SVVECDNKIL KAFIDDNGNL KGICDNKYP
FMPRQKLPKT YMSGAIYIV KSNLFLNNPT FLQEKTSYI MDEKASLDID TTEDLKRNN ISFL

SEQ ID NO: 26: Nucleotide sequence of β 1,3-galactosyltransferase-encoding ORF 6a of *LOS* biosynthesis locus from *C. jejuni* strain OH4384

ATGTTTAAAA	TTTCAATCAT	CTTACCAACT	TATAATGTGG	AACAATATAT	50
AGCAAGGGCA	ATAGAAAGCT	GTATCAATCA	GACTTTTAAA	GATATAGAAA	100
TAATTGTAGT	TGATGATTGT	GGAAATGATA	ATAGTATAAA	TATAGCCAAA	150
GAATACTCTA	AAAAAGACAA	AAGAATAAAA	ATAATCCACA	ATGAAAAAAA	200
CTTAGGTCTT	TTAAGAGCAA	GATATGAAGG	TGTGAAAGTA	GCAAACCTCTC	250
CTTATATAAT	GTTTTTAGAT	CCTGATGATT	ATTGGAACCT	AAATGCTTGT	300
GAAGAGTGTA	TAAAAATTTT	AGATGAACAG	GATGAAGTTG	ATTTAGTGTT	350
TTTCAATGCT	ATTGTTGAAA	GTAATGTTAT	TTCATATAAA	AAGTTTGACT	400
TTAATTCTGG	TTTTTATAGC	AAAAAAGAGT	TTGTAAAAAA	AATTATTGCA	450
AAGAAAAATT	TATATTGGAC	TATGTGGGGG	AAACTTATAA	GAAAGAAATT	500
GTATTTAGAA	GCTTTTGCGA	GTTTAAAGACT	CGAGAAAGAT	GTTAAAATCA	550
ATATGGCTGA	AGATGTATTG	TTATATTATC	CAATGTTAAG	TCAAGCTCAA	600
AAAATAGCAT	ATATGAAGCTG	TAATTTATAT	CATTACGTGC	CTAATAATAA	650
TTCAATTTGT	AATACTAAGA	ATGAAGTGCT	TGTTAAAAAT	AATATTCAAG	700
AGTTGCAGTT	GGTTTTAAAC	TATTTAAGGC	AAAATTATAT	TTTAAACAAG	750
TATTGTAGCG	TTCTCTATGT	GCTAATTAAA	TATTTGCTAT	ATATTCAAAT	800
ATATAAAATA	AAAAGAACAA	AATTAATGGT	TACATTATTA	GCTAAAAATA	850
ATATTTTAAAC	TTTAAAAATT	TTATTTAAAT	ATAAAAAATT	TTTAAAACAA	900
TGTTAA					906

SEQ ID NO: 27 Amino acid sequence of β 1,3-galactosyltransferase encoded by ORF 6a of *LOS* biosynthesis locus from *C. jejuni* strain OH4384

	10	20	30	40	50
1	MFKISIIILPT	YNVEQYIARA	IESCINQTFK	DIEIIVVDDC	GNDNSINIAK
51	EYSKKDKRIK	IIHNEKNLGL	LRARYEGVKV	ANSPYIMFLD	PDDYLELNAC
101	EECIKILDEQ	DEVDLVFFNA	IVESNVISYK	KDFNSGFYS	KKEFVKKIIA
151	KKNLYWTMWG	KLIRKKLYLE	AFASLRLEKD	VKINMAEDVL	LYYPMLSQAQ
201	KIAYMNCNLY	HYVPNNNSIC	NTKNEVLVKN	NIQELQLVLN	YLRQNYILNK
251	YCSVLYVLIK	YLLYIQIYKI	KRTKLMVTLL	AKINILTLKI	LFKYKKFLKQ
301	C				

SEQ ID NO: 28. Nucleotide sequence of CgtB β 1,3 galactosyltransferase from *C. jejuni* serotype O:2 (strain NCTC 11168).

ATGAGTCAAA	TTTCCATCAT	ACTACCAACT	TATAATGTGG	AAAAATATAT	50
TGCTAGAGCA	TTAGAAAGTT	GCATTAACCA	AACTTTTAAA	GATATAGAAA	100
TCATTGTAGT	AGATGATTGT	GGTAATGATA	AAAGTATAGA	TATAGCTAAA	150
GAGTATGCTA	GTAAAGATGA	TAGAATAAAA	ATCATACATA	ATGAAGAGAA	200
TTTAAAGCTT	TTAAGAGCAA	GATATGAAGG	TGCTAAAGTA	GCAACTTCAC	250
CTTATATCAT	GTTTTTAGAT	TCTGATGATT	ATTTAGAACT	TAATGCTTGC	300
GAAGAATGTA	TTAAAATTTT	GGATATGGGT	GGGGGGGGTA	AAATTGATTT	350
GTTGTGTTTT	GAAGCTTTTA	TTACCAATGC	AAAAAAATCA	ATAAAAAAAT	400
TAAATATAAA	ACAAGGAAAA	TACAACAACA	AAGAATTTAC	AATGCAAATA	450
CTTAAACTA	AAAATCCATT	TTGGACAATG	TGGGCTAAAA	TAATCAAAAA	500
AGATATTTAT	TTAAAAGCCT	TCAACATGTT	AAATCTCAAA	AAAGAAATCA	550
AAATAAATAT	GGCAGAAGAT	GCCTTATTAT	ATTATCCTTT	GACAATATTA	600
TCTAATGAAA	TATTTTACTT	AACACAACCT	TTGTATACCC	AGCATGTAAA	650
TAGCAATTCT	ATAACAAATA	ATATTAATTC	TTTAGAAGCT	AATATTCAAG	700
AACATAAAAT	TGTTTTAAAT	GTTTTTAAAT	CAATTAAAAA	TAAAAAAACA	750
CCTCTATATT	TTCTAATTAT	ATATTTATTA	AAAATTCAAT	TATTGAAATA	800
TGAACAAAAT	TTTAATAAAA	GAAATATAAA	TCTTATTTAT	TATAAAATAA	850
ATATTTTATA	TCAAAAATAT	CAATTCAAAT	GGAAAAAATT	TTTATATAAT	900
TTAATTCCGT	AA				912

SEQ ID NO: 29. Amino acid sequence of CgtB β 1,3 galactosyltransferase from *C. jejuni* serotype O:2 (strain NCTC 11168).

	10	20	30	40	50
1	MSQISIIILPT	YNVEKYIARA	LESCINQTFK	DIEIIVVDDC	GNDKSIDIAC
51	EYASKDDRIK	IIHNEENLKL	LRARYEGAKV	ATSPYIMFLD	SDDYLELNAC
101	EECIKILDMG	GGGKIDLLCF	EAFITNAKKS	IKKLNIKQ GK	YNNKEFTMQL
151	KTKNPFWTMW	AKIIKKDIYL	KAFNMLNLKK	EIKINMAEDA	LLYYPLTILS
201	NEIFYLTQPL	YTQHVNSNSI	TNNINSLEAN	IQEHKIVLNV	LKSIKNKKTP
251	LYFLIIYLLK	IQLLKYEQNF	NKRNINLIYY	KINILYQKYQ	FKWKKFLYNL
301	IP				

SEQ ID NO. 30: Nucleotide sequence of β -1,3-galactosyl transferase from *C. jejuni* O:10

```

ATGTTTAAAA TTTCAATCAT CTTGCCAACT TATAATGTGG AACAAATATAT AGCAAGGGCA
ATAGAAAGTT GTATCAATCA GACTTTTAAA AATATAGAAA TAATTGTAGT TGATGATTGT
GGAAGTGACA AAAGTATAGA TATAGTTAAA GAATATGCCA AAAAAGATGA TAGAATAAAA
ATCATAACATA ATGAAGAAAA TTTAAACTTT TTAAGAGCTA GATATGAAGG TGTAAAAGTA
GCAAACTCTC CTTATATAAT GTTTTATAGAT CCTGATGATT ATTTAGAACT TAATGCTTGT
GAAGAATGTA TGAAAATTTT AAAAAACAAT GAAATAGATT TATTATTTTT TAATGCATTT
GTATTGGAAA ATAACAATAA AATAGAAAGA AAGTTGAATT TTCAAGAAAA ATGTTATGTA
AAAAAAGATT TTTTAAAGA ACTATTAAAA ACTAAAAATT TATTTTGGAC AGTGTGGGCA
AAAGTCATAA AAAAGAATT ATATCTCAAG GCTGTTGGTT TAATATCGCT AGAAAATGCT
AAAATAAATA TGGCTGAAGA TGTTTTATTA TATTACCCTT TGATAAATAT TTCAAATACT
ATATTTTCACT TGAGTAAAAA TTTATACAAT ATACAAATAA ATAATTTCTC TATAACCAAA
ACATTAACAT TGCAAAATAT AAAAAACAAAT ATACAAGAAC AAGATAATGT TCTATATCTT
CTAAGAAGA TGCAATATAA TTACAATTTT AACTTAACTT TGCTTAAATT AATTGAGTAT
TTTTTATTAA TTGAAAAATA CTCATTATCA AGCAAGCGAA ATGTTCTTTG TTTTAAATC
AATATTTTTT TTAAAAAAAT CCAATTTAAA TTTTATCGCT TGCTGAAGAT G

```

SEQ ID NO. 31: Amino acid sequence of β -1,3-galactosyl transferase from *C. jejuni* O:10

```

MFKISII LPT YNVEQYIARA IESCINQTFK NIEIIVDDC GSDKSIDIVK EYAKKDDRI
KIIHNEENLK LLRARYEGVK VANSPIYIMFL DPDDYLELNA CEECMKILKN NEIDLLFFN
AFVLENNNKI ERKLNFOEKC YVKKDFLKE LKTKNLFWTV WAKVIKKELY LKAVGLISL
ENAKINMAED VLLYYPLINI SNTIFHLSKN LYNQINNFS ITKTLTLQNI KTNIQEQDN
VLYLLKKMQY NYNFNLTLLK LIEYFLLEIK YSLSSKRNV LCFKINIFFKK IQFKFYRL LK M

```

SEQ ID NO: 32. Amino acid sequence of lipid A biosynthesis acyltransferase (*C. jejuni* OH4384).

```

1  MKNSDRIYLS LYIILKFFVT FMPDCILHFL ALIVARIAFH LNKKHRKIIN
51  TNLQICFPQY TQKERDKLSL KIYENFAQFG IDCLQNQNTT KEKILNKVNF
101 INENFLIDAL ALKRPIIFTT AHYGNWEILS LAYAAKYGAI SIVGKKLKSE
151 VMYEILSQSR TQFDIELIDK KGGIRQMLSA LKKERALGIL TDQDCVENES
201 VRLKFFNKEV NYQM GASLIA QRSNALIIPV YAYKEGGKFC IEFKAKDSQ
251 NASLEELTLY QAQSCEEMIK KRPWEYFFFH RRFASYNEEI YKGAK

```

SEQ ID NO: 33. Amino acid sequence of glycosyltransferase encoded by ORF 3a of *C. jejuni* OH4384 *LOS* locus.

```

1  MNLKQISVII IVKNAEQTLL ECLNSLKDFD EIILLNNESS DNTLKIANEF
51  KKDFANLYIY HNAFIGFGAL KNLALS YAKN DWILSIDADE VLENECIKEL
101 KNLKLQEDNI IALSRKNLYK GEWIKACGWW PDYVLRIFNK NFTRFNDNLV
151 HESLVLP SNA KKIYLNGLK HYSYKDISHL IDKMQYYSSL WAKQNIHKKS
201 GVLKANLRAF WTFFRNYFLK NGFLYGYKGF IISVCSALGT FFKYMKLYEL
251 QRQKPKTCAL IIITYNQKER LKLVLD SVKN LAFLPNEVLI ADDGSKEBTA
301 RLIEEYQKDF PCPLKHIWQE DEGFKLSKSR NKTIKNADSE YIIVIDGDMI
351 LEKDFIKEHL EFAQRKLFLQ GSRVILNKKE SEEILNKDDY RIIFNKKDFK
401 SSKNSFLAKI FYSLSKKR

```

SEQ ID NO: 34. Amino acid sequence of glycosyltransferase encoded by ORF 4a of *C. jejuni* OH4384 *LOS* locus.

```

1  MKKIGVVIPI  YNVEKYLREC  LDSVINQTYT  NLEIILVNDG  STDEHSLNIA
51  KEYTLKDKRI  TLFDKKNGL  SSARNIGIEY  FSGEYKLKNK  TQHIKENSIL
101 EFQLDGNNPY  NIYKAYKSSQ  AFNNEKDLTN  FTYPSEDYII  FLDSDNYWKL
151 NCIEECVIRM  KNVDVLWFDH  DCTYEDNIKN  KHKKTRMEIF  DFKKECIITP
201 KEYANRALSV  GSRDISFGWN  GMIDFNFLKQ  IKLKFINFII  NEDIHFGIIL
251 FASANKIYVL  SQKLYLCRLR  ANSISNHDKK  ITKANVSEYF  KDIYETFGEN
301 AKEAKNYLKA  ASRVITALKL  IEFKDKQNE  NALAIKETFL  PCYAKKALMI
351 KKFKKDPLNL  KEQLVLIKPF  IQTKLPYDIW  KFWQKIKNI

```

SEQ ID NO: 35. Amino acid sequence of sialic acid synthase encoded by ORF 8a of *C. jejuni* OH4384 *LOS* locus.

```

1  MKEIKIQNII  ISEEKAPLVV  PEIGINHNG  SLELAKIMVD  AAFSTGAKII
51  KHQTHIVEDE  MSKAAKKVIP  GNAKISIEY  MQKCALDYKD  ELALKEYTEK
101 LGLVYLSTPF  SRAGANRLED  MGVSAFKIGS  GECNNYPLIK  HIAAFKKPMI
151 VSTGMNSIES  IKPTVKILLD  NEIPFVLMHT  TNLYPTPHNL  VRLNAMLELK
201 KEFSCMVGLS  DHTTDNLACL  GAVALGACVL  ERHFTDSMHR  SGPDIVCSMD
251 TQALKELIIQ  SEQMAIMRGN  NESKKAQKE  QVTIDFAFAS  VVSIKDIKKG
301 EVLSMDNIWV  KRPGLGGISA  AEFENILGKK  ALRDIENDTQ  LSYEDFA

```

SEQ ID NO: 36. Amino acid sequence of enzyme involved in sialic acid biosynthesis encoded by ORF 9a of *C. jejuni* OH4384 *LOS* locus.

```

1  MYRVQNSSEF  ELYIFATGMH  LSKNFGYTVK  ELYKNGFKNI  YEFINYDKYF
51  STDKALATTI  DGFSRYVNEL  KPDLIIVVHG  RIEPLAAAI  GALNNILVAH
101 IEGGEISGTI  DDSLRHAISK  LAHIHLVND  FAKRRMLQLG  EDEKSIFIIG
151 SPDLELLNDN  KISLNEAKKY  YDINYENYAL  LMFHPVTTEI  TSIKNQADNL
201 VKALIQSNKN  YIVIYPNDNL  GFELILQSYE  ELKNNPRFKL  FPSLRFEYFI
251 TLLKNADFII  GNSSCILKEA  LYLKTAGILV  GSRQNGRLGN  ENTLKVNANS
301 DEILKAINTI  HKKQDLFSK  LEILDSSKLF  FEYLQSGEFF  KLNTQKVFKD
351 IK

```

SEQ ID NO: 37. Amino acid sequence of CMP-sialic acid synthetase encoded by ORF 10a of *C. jejuni* OH4384 *LOS* locus.

```

1  MSLAIIPARG  GSKGIKKNL  VLLNNKPLIY  YTIKAALNTK  SISKVVVSSD
51  SDEILNYAKS  QNVDILKRPI  SLAQDNTTSD  KVLLHALKFY  KDYEDVVFLQ
101 PTSPLRTNIH  IDEAFNLYKN  SNANALISVS  ECDNKILKAF  VCNEYGDLAG
151 ICNDEYPFMP  RQKLPKTYMS  NGAIYILKIK  EFLNNPSFLQ  SKTKHFLMDE
201 SSSLDIDCLE  DLKKAQIWK  K

```

SEQ ID NO: 38. Amino acid sequence of acetyltransferase encoded by ORF 11a of *C. jejuni* OH4384 *LOS* locus.

```

1  MEKITLKCNC  NILNLLKQYN  IYTKTYIENP  RFRSLKTKD  FITFPLENNQ
51  LESVAGLGIE  EYCAFKFSNI  LHEMDSFSFS  GSFLPHYTKV  GRYCSISDGV

```

101 SMFNFQHPMD RISTASFTYE TNHSFINDAC QNHINKTFPI VNHNPSSSIT
 151 HLI IQDDVWI GKDVLLKQGI TLGTGCVIGQ RAVVT KDVPV YAI VAGIPAK
 201 I IKYRFDEKT IERLLKI QWW KYHFADFYDI DLNLKINQYL DLLEEKI IKK
 251 SISYYNPNKL YFRDILELKS KKIFNLF

SEQ ID NO: 39. Amino acid sequence of glycosyltransferase encoded by ORF 12a of *C. jejuni* OH4384 *LOS* locus.

1 MPQLSII IPL FNSCDFISRA LQSCINQTLK DIEILIIDDK SKDNSLNMVL
 51 EFAKKDPRIK IFQNEENLGT FASRN LGVLH SSSDFIMFLD SDDFLTPDAC
 101 EIAFKEMKKG FDL LCFDAFV HRVKT KQFYR FKQDEVFNQK EFLEFLSKQR
 151 HFCWSVWAKC FKKDIILKSF EKIKIDERLN YGEDVLFCYI YFMFCEKIAV
 201 FKTCIYHYEF NPNGRYENKN KEILNQNYHD KKKSNEI IKK LSKEFAHDEF
 251 HQKLFEVLKR EEAGVKNRLK